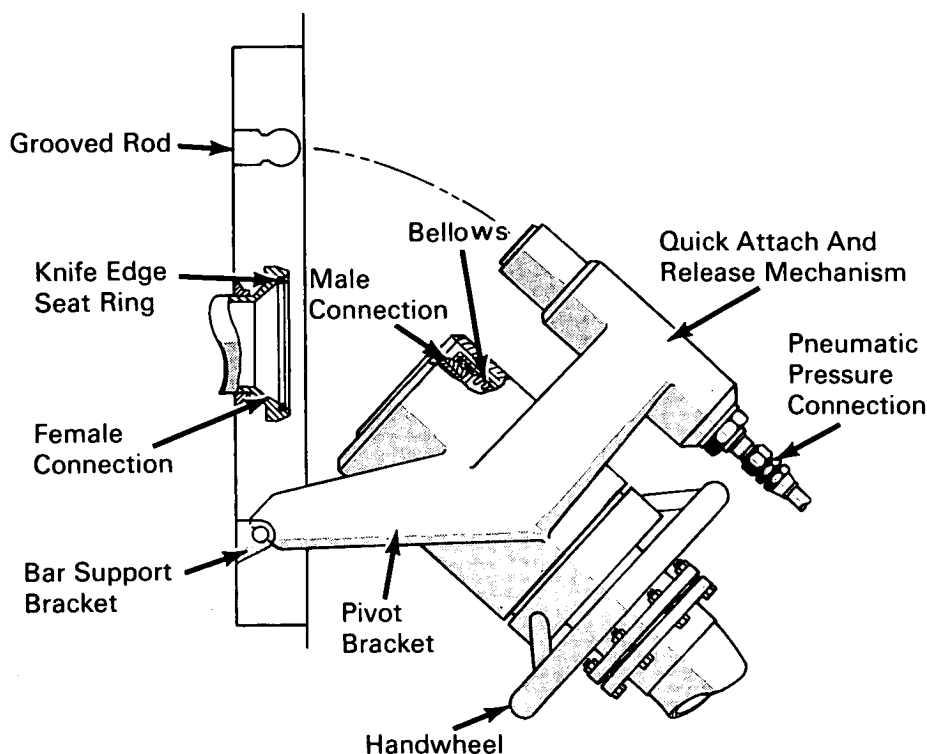


NASA TECH BRIEF



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Quick Attach and Release Fluid Coupling Assembly Is Self-Aligning, Self-Sealing



The problem:

To design a quick attach and release fluid coupling assembly that is highly reliable and can handle cryogenic fluids where icing is encountered. Lipseal cylinder-type couplings, which were used for cryogenic applications, were subject to leakage and misalignment and were sensitive to icing and freezing conditions. They were unreliable during test and practically impossible to reconnect and seal when frozen. Major coupling components had to be replaced after a limited number of tests.

The solution:

A fluid coupling assembly that is self-aligning, self-sealing and contains a bellows ball and socket coupling for quick attach and release.

How it's done:

The coupling assembly consists of three basic units: the female portion, the male portion, and the securing mechanism. The female connection is a conical frustum with a seal ring mounted around the inner surface. The male connection engages the knife edge of the female connection's seal ring. Since the male

(continued overleaf)

connection is spherical, the longitudinal centerlines of the coupling halves need not be parallel or aligned to assure proper sealing and operation. The male portion of the coupling is initially seated against the female by rotating the handwheel until the spherical male connection engages the conical female connection. When fluid under pressure is introduced into the coupling, the bellows will expand, applying additional pressure to the mating surfaces of the coupling.

Decoupling is initiated when pneumatic pressure to the quick attach and release mechanism forces it from the grooved rod.

Notes:

1. The coupling assembly is believed to be unique because: (a) the conical and spherical mating surfaces eliminate alignment problems, permitting leak-free coupling and positive coupling separation; (b) the knife edge of the ring seal removes ice present at the mating surface; and (c) the handwheel assures proper seating initially, and the bellows assures proper seating as fluid under varying pressures flows through the coupling.

2. The fluid coupling assembly could be used in many fluid systems, but is particularly applicable to cryogenic systems.
3. Inquiries concerning this invention may be directed to:

Technology Utilization Officer
Kennedy Space Center
Kennedy Space Center, Florida 32899
Reference: B66-10627

Patent status:

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(KSC-66-8)